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Photographic Interpretation Handbook, United States Forces: Section 08 Technical Studies

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SECTION 8
TECHNICAL STUDIES

8.01 —— 8.99

REFERENCES

GUNS

Japanese Anti-Aircraft and Coastal Defense Positions - October 1943 (Revised)

ADDENDA : 9W 9X 9T 803-J-2 44 Feb. 44

SEARCHLIGHTS

P.I.C. No. 27 - 568 9-E-2 44 Feb. 1944

CAMOUFLAGE

OPNAV-16-V P 29
9X 1 9X4 9W4 9W5
9W6 9T8 5T9 5X4 5L0
8Q3 - E-4 44

OBSTACLES

P.I.C. No. 11 - 9X4-SR-1/44

ELECTRONICS

P.I.C. No. 2 - 5/6/8/9 - K-1/44

TABLE FOR DETERMINING CALIBER OF JAPANESE ANTI-AIRCRAFT AND COASTAL DEFENSE WEAPONS

	CALIBER	PURPOSE	REVETMENT SIZE (INSIDE DIAM) APPROX.	REVETMENT SHAPE	LENGTH OF GUN	LENGTH OF BARREL	DIMENSIONS OF SHIELD	SHAPE OF SHIELD	NUMBER OF BARRELS	TYPE OF MOUNT	ASSOCIATED FIRE CONTROL	AVERAGE NUMBER OF GUNS IN BATT.	BATTERY PATTERN	APPROX. RANGE (MAX.)	ELEVATION	TRAVERSE	REMARKS
LIGHT CALIBER	6.5MM.	MACHINE GUN	6'-8'	SQUARE CIRCULAR	—	—	NONE	NONE	SINGLE	PEDESTAL TRIPOD	—	—	—	—	—	—	FOUND ASSOCIATED WITH A.A. AND C.D. BATTERIES. SMALL SPLINTER SHIELDS MAY BE FOUND ON THESE GUNS WHEN ON PEDESTAL MOUNT. (TARAWA)
	7.7MM.	MACHINE GUN	6'-8'	SQUARE CIRCULAR	—	—	NONE	NONE	SINGLE	PEDESTAL TRIPOD	—	—	—	—	—	—	FOUND ASSOCIATED WITH A.A. AND C.D. BATTERIES. SMALL SPLINTER SHIELDS MAY BE FOUND ON THESE GUNS WHEN ON PEDESTAL MOUNT. (TARAWA)
	.52" 13MM.	A.A. AND C.D.	SINGLE 8'-10' TWIN 10'-12'	SQUARE CIRCULAR HEXAGONAL PEAR-SHAPE IRREGULAR	6'	4'	NONE	NONE	SINGLE TWIN	PEDESTAL (TWIN AND SINGLE) TRIPOD (TWIN)	TRACER	SINGLES 1-7 TWINS 2-4	IRREGULAR	V-13,120' H-7,085 YDS.	90°	360°	NO FIRE CONTROL POSITION ASSOCIATED WITH THESE GUNS. USED ON TARAWA, VILA, AND MUNDA FOR BEACH DEFENSES AND ASSOCIATED WITH HEAVY A.A. AND C.D. BATTERIES. USUALLY FOUND IN LOG AND SAND OR EARTH EMPLACEMENTS.
	.8" 20MM.	A.A. AND C.D.	8'-15'	CIRCULAR "DOUGHNUT" SHAPED	7'	7'	NONE	NONE	SINGLE TWIN	TRIPOD (3 SPIDERS) PEDESTAL WHEELS	TRACER AND 10 CM. BINOCULAR	2-5	IRREGULAR ARCUATE	V-12,000' H-5,450 YDS.	80°	360°	SIMPLIFIED FIRE CONTROL SYSTEM. MAY BE SET UP INDIVIDUALLY, OR IN BATTERY PATTERN SIMILAR TO HEAVY A.A. MOUNTED ON WHEELS FOR MOBILITY. PEDESTAL MOUNT FOR TWIN BARREL WEAPON AT VILA.
	1.0" 25MM.	A.A. AND C.D.	14'-16'	CIRCULAR "DOUGHNUT" SHAPED	9'	4.5'	NONE	NONE	SINGLE TWIN TRIPLE	PEDESTAL SHIPBOARD MOUNT	TRACER AND 10 CM. BINOCULAR	2-4	IRREGULAR CAPITAL "L"	V-12,000' H-15,000 YDS.	85°	360°	WIDTH OF GUN MECHANISM IN TWIN BARREL MOUNT IS 5'-8". AT TARAWA THE COMMAND CENTER WAS LOCATED IN PREFABRICATED, HEXAGONAL STEEL "TURRET". LOCATED IN "DOUGHNUT"-SHAPED DOUBLE REVETMENT AT VILA.
	1.6" 37MM (40MM.)	A.A. AND C.D.	12'-16'	CIRCULAR "DOUGHNUT" SHAPED	9'	5'	NONE	NONE	TWIN	PEDESTAL SHIPBOARD MOUNT	BINOCULAR	2-5	IRREGULAR ARCUATE	—	85°	360°	WIDTH OF GUN MECHANISM IN TWIN BARREL MOUNT IS 8'-9". LOCATED IN "DOUGHNUT"-SHAPED EMPLACEMENT AT VILA WITH DEEP OUTER DITCH (10'-12' DEEP) OFF OF WHICH UNDERGROUND LIVING QUARTERS WERE CONSTRUCTED.
	2.2" 55MM.	A.A. AND C.D.	—	—	—	— NO INFORMATION AVAILABLE						—	—	—	—	—	—
HEAVY CALIBER	3" 75MM. (70MM.)	A.A. AND C.D.	18'-20' 15'	CIRCULAR PENTAGONAL "DOUGHNUT" SHAPED	10.2'	10.2'	NONE	NONE	SINGLE	FIVE SPIDERS PEDESTAL	3 METER R.F. 10CM. BINOCULARS COMPUTERS SOUND LOCATOR	4-6	ARCUATE TRAPEZOIDAL CAPITAL "L" IRREGULAR	V-33,000' H-15,200 YDS.	85°	360°	FLANKING SEARCHLIGHTS IN SOME CASES. THE FIVE SPIDERS, WHEN VISIBLE, ARE DISTINCTIVE. GUNS MAY BE FOUND IN IS' EMPLACEMENT WITH SPIDERS COVERED. EMPLACEMENT IS USUALLY SANDBAGS OR EARTH REINFORCED WITH LOGS, AND WITH READY MAGAZINES IN WALLS.
	3.2" 80MM (76MM.)	C.D.	16'	SQUARE (COVERED) HEXAGONAL (OPEN)	10'	10'	NONE	NONE	SINGLE	PEDESTAL	3 METER RANGE FINDER	2-3	STRAIGHT LINE	H-9,000 YDS.	30°	360° (UNLESS COVERED)	A GABLED TYPE OF PALM BRANCH CAMOUFLAGE WAS USED AT TARAWA PLACED OVER A HEXAGONALLY-SHAPED, OPEN EMPLACEMENT, CONSTRUCTED OF SAND AND LOGS. COVERED TYPE EMPLACEMENT USED IN CLIFF POSITIONS AT KISKA, AND SHORE POSITIONS AT VILA AND MUNDA. POSITIONS DISTINGUISHED IN PHOTOS BY APERATURE, SPOIL, BEACH TRENCH SYSTEM DIVERTED AROUND POSITION, AND SHORT ENTRANCE TRENCHES AT REAR.
	3.6" 90MM.	A.A. AND C.D.	—	—	—	— NO INFORMATION AVAILABLE						—	—	—	—	—	—
	4.2" 105MM.	A.A. AND C.D.	25'-30'	CIRCULAR	12' (APPROX)	12' (APPROX)	NONE	NONE	SINGLE	SIX SPIDERS	3 METER RANGE FINDER DATA COMPUTER	NOT AVAILABLE	NOT AVAILABLE	V-36,000' H-19,400 YDS.	85°	360°	NO GUN OF THIS CALIBER HAS BEEN CAPTURED TO DATE. MAY BE IN 28' EMPLACEMENT WITH SPIDERS REMOVED
	4.8" 120MM.	A.A. AND C.D.	22'	CIRCULAR	21'-22'	12'	9'X 10'	RECTANGULAR PLAN	SINGLE	PEDESTAL SET IN SOIL OR CONCRETE	3 METER R.F. 10CM. BINOCULARS COMPUTERS COMMUNICATION CENTER	4	CAPITAL "L" STRAIGHT LINE	V-25,000' H-21,000 YDS.	85°	360°	DISTINGUISHED BY LARGE, CONSPICUOUS, SLOTTED SHIELD. EMPLACEMENTS AT KISKA PLACED ABOUT 120' APART. FIRE CONTROL LOCATED IN EMPLACEMENT TO REAR-CENTER OF BATTERY. LOW EARTH AND SANDBAG REVETMENT.
	4.7" 120MM. (118MM.)	C.D.	20'	"HALF-MOON" SHAPED SQUARE (COVERED)	16.5'	16.5'	NONE	NONE	SINGLE	PEDESTAL SET IN CONCRETE	3 METER RANGE FINDER	4	STRAIGHT LINE ARCUATE	H-17,500 YDS.	30°	360° (UNLESS COVERED)	TWO 150 CM. SEARCHLIGHTS FLANKED A BATTERY OF THESE GUNS AT KISKA. THICK BLAST WALL, CONTAINING READY MAGAZINE, AT REAR OF EMPLACEMENT AT KISKA. LOW EARTH AND SANDBAG REVETMENT. ROPE NET CAMOUFLAGE SOMETIMES USED. 2 OF 4 OF THESE GUNS CAPTURED AT KISKA, WERE OF BRITISH MAKE. EMPLACED IN COVERED REVETMENT AT VILA AND MUNDA.
	5" 127MM.	A.A. AND C.D.	33'-36'	CIRCULAR	18'	12'	6'X 12'	RECTANGULAR PLAN	TWIN	PEDESTAL	3 METER R.F. ALTITUDE FINDER DIRECTOR	2	STRAIGHT LINE LOW TRIANGLE	—	85°	360°	FIRE CONTROL LOCATED TO REAR-CENTER OF BATTERY. GUNS LOCATED IN CONCRETE EMPLACEMENT BANKED WITH SAND. (TARAWA) EMPLACEMENTS ARE ABOUT 40 YARDS APART. (TARAWA) AMMUNITION CHAMBER AND ELECTRIC DRIVE APPARATUS LOCATED BELOW GUN. THESE GUNS CAPTURED ON TARAWA, WERE OF BRITISH MAKE.
	5.6" 140MM.	C.D.	35'-38'	CIRCULAR	23'	14.9'	8'X 8'	SQUARE WITH ROUNDED FRONT CORNERS	SINGLE	PEDESTAL SET IN CONCRETE	OBSERVATION TOWER ON TOP OF BOMBPROOF SHELTER ELECTRIC DISTRIBUTION BOARD CONTROL CENTER	2-3	STRAIGHT LINE	—	20°	360°	ON TARAWA THESE GUNS WERE MOUNTED IN CONCRETE EMPLACEMENTS, BANKED WITH SAND. EMPLACEMENTS AT TARAWA WERE LOCATED ABOUT 80 YARDS APART. A NARROW GAUGE RAILROAD, LAID IN A TRENCH, LED FROM AMMUNITION SHELTER TO GUN POSITION. (TARAWA)
	6" 150MM.	C.D.	26'-30' (35')	CIRCULAR IRREGULAR	20'	12'	8' LONG 4'-6' WIDE	WEDGE SHAPE	SINGLE	HEAVY STEEL SPIDERS	3 METER RANGE FINDER	3	STRAIGHT LINE	H-14,200 YDS.	20°	360°	LOCATED IN 28'-30' EMPLACEMENTS AT KISKA. A LARGER EMPLACEMENT (ABOUT 35') SHOULD BE EXPECTED IN MOST CASES. FIRE CONTROL CENTER LOCATED IN SMALL COVERED BUILDINGS BEHIND EMPLACEMENTS. 3 OF 6 OF THESE GUNS CAPTURED AT KISKA, WERE OF BRITISH MAKE.
	8" 200MM	C.D.	38'-40'	CIRCULAR	38.8'	19.2'	12'6" LONG 11'0" WIDE 8'7" PLATFORM ON REAR		SINGLE	PEDESTAL SET IN CONCRETE	OBSERVATION TOWER RANGE FINDER DIRECTOR	2	STRAIGHT LINE	—	30°	360°	ON TARAWA THESE GUNS WERE MOUNTED IN CONCRETE EMPLACEMENTS, BANKED WITH SAND. DAVIT-TYPE AMMUNITION HOIST CRANE MOUNTED ON GUN. 8" WIDE STEEL AMMUNITION TROUGH ALMOST COMPLETELY ENCIRCLES GUN. NARROW GAUGE RAILROAD LAID IN TRENCH LED FROM AMMUNITION SHELTER TO GUN POSITION. THESE GUNS CAPTURED ON TARAWA WERE OF BRITISH MAKE.

P.I.C. ANACOSTIA, D.C. FEB. 1944

RESTRICTED

TABULATED COMPILATION OF JAPANESE SEARCHLIGHT CHARACTERISTICS

LOCALITY	SEARCHLIGHT SIZE	TYPE MOUNT	EMPLACEMENT CHARACTERISTICS	EMPLACEMENT SIZE	POWER SOURCE	ASSOCIATED INSTALLATIONS	REMARKS
MUNDA	60 CM.	MOBILE	SMALL CIRCULAR EXCAVATED EMPLACEMENT.	8' INNER DIAMETER	POWER STATION LOCATED NEARBY	BEACH DEFENSE GUN POSITIONS A.A. GUNS, 2 SEARCHLIGHT POSITIONS (60 CM. & 100 CM.)	SMALL, CIRCULAR, EXCAVATED EMPLACEMENT WITH BREAK IN WALL FOR REMOVAL OF LIGHT.
TARAWA	90 CM.	FIXED OR MOBILE	ON RAISED WOOD AND EARTH STRUCTURE WHICH WAS FIRE CONTROL CENTER FOR DUAL PURPOSE GUN BATTERY	15' SQUARE	GENERATOR LOCATED NEARBY	4 GUN 75 MM DUAL PURPOSE BATTERY RANGEFINDER & SOUND DETECTOR	LIGHT MOUNTED ON SLIGHTLY RAISED EARTH & WOOD FIRE CONTROL CENTER FOR DUAL PURPOSE 75 MM BATTERY
KISKA	98 CM.	FIXED	LOW BUILT-UP TYPE OF SAND-BAG REVETMENT.	16' INNER DIAMETER	SMALL SUB-STATION LOCATED NEARBY FOR STEPPING-UP AMPERAGE FROM MAIN POWER SOURCE.	75 MM A.A. BATTERY	LOW CIRCULAR SANDBAG-EARTH REVETMENT. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
LITTLE KISKA	98 CM.	FIXED	MOUNTED ON WELL REVETTED CAMOUFLAGED TRUCK.	———	GENERATOR BUILT-IN TRUCK	4 GUN 13 MM A.A. BATTERY	HAD APPEARANCE OF SMALL RECTANGULAR STRUCTURE IN VERTICAL VIEW.
TARAWA	100 CM.	MOBILE	SQUARE, BUILT-UP TYPE EARTH EMPLACEMENT.	10'-12' SQUARE	GENERATOR LOCATED NEARBY	NONE	LIGHT MOUNTED IN SQUARE, BUILT-UP TYPE EARTH EMPLACEMENT. GENERATOR LOCATED NEARBY.
TARAWA	110 CM.	MOBILE	IN CIRCULAR EXCAVATED REVETMENT.	10'-12' INNER DIAM.	GENERATOR LOCATED NEARBY	NEAR A.A. & C.D. BATTERIES	LIGHT LOCATED IN CIRCULAR, EXCAVATED REVETMENT.
TARAWA	150 CM.	FIXED	ROUND CONCRETE STRUCTURE	10'-12' DIAMETER	GENERATOR IN MOUNT STRUCTURE	NEAR A.A. & C.D. BATTERIES	LIGHT MOUNTED ON ROOF OF CIRCULAR CONCRETE STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
TARAWA	150 CM.	FIXED	RECTANGULAR CONCRETE STRUCTURE	12' X 10' BY 8' HIGH	GENERATOR IN MOUNT STRUCTURE	2 GUN 127 MM DUAL PURPOSE BATTERY 150 CM. SEARCHLIGHT	LIGHT MOUNTED ON ROOF OF LOW, RECTANGULAR, CONCRETE STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
MUNDA	150 CM.	MOBILE	"DOUGHNUT" SHAPED CIRCULAR DOUBLE REVETMENT.	44' INNER DIAM. OF OUTER REV'T, 10'-12' INNER DIAM. OF INSIDE REV'T.	POWER STATION LOCATED NEARBY	HIDE-OUT FOR LIGHT LOCATED NEARBY ALSO POWER TRUCK REV'T	"DOUGHNUT" SHAPED DOUBLE REVETMENT WITH PATH BETWEEN INNER & OUTER REVETMENT FOR MANUAL OPERATION OF LIGHT. BREAK IN WALL AND TRAIL FOR REMOVAL OF LIGHT TO HIDE-OUT AREA.
KISKA	150 CM.	FIXED	LOW, BUILT-UP TYPE OF EARTH REVETMENT.	16' INNER DIAMETER	SMALL SUB-STATION LOCATED NEARBY FOR STEPPING-UP AMPERAGE FROM MAIN POWER SOURCE	4 GUN (4.7) 118 MM C.D. BATTERY TWIN SEARCHLIGHT POSITION	LOW CIRCULAR REVETMENT. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
VILA	150 CM.	MOBILE	CIRCULAR, EXCAVATED TYPE OF EARTH REVETMENT.	18'-22' DIAMETER	GENERATOR LOCATED NEARBY	5 GUN A.A. BATTERY ONE EMPLACEMENT OF WHICH CONTAINED LIGHT	SIMPLE EXCAVATED TYPE EARTH REVETMENT WITH BREAK IN WALL FOR REMOVAL OF LIGHT. SOD COVER OVER EMPLACEMENT FOR CAMOUFLAGE.
VILA	150 CM.	MOBILE	CIRCULAR TYPE "OIL DRUM" REVETMENT.	16' INNER DIAMETER	GENERATOR LOCATED NEARBY	SOUND LOCATOR	REVETMENT FORMED BY PLACING EARTH-FILLED OIL DRUMS ON END IN CIRCULAR PATTERN.
PARAMUSHIRO	150 CM.	MOBILE	HIGH, BUILT-UP TYPE OF EARTH REVETMENT.	30' INNER DIAMETER	POWER SOURCE NEARBY	DIRECTOR IN SAUCER-SHAPED (35°) REVETMENT NEARBY. 6 GUN 75 MM A.A. BATTERY	HIGH CIRCULAR BUILT-UP TYPE REVETMENT WITH BREAK IN WALL FOR REMOVAL OF LIGHT. DIRECTOR LOCATED IN 35° BUILT-UP TYPE, SAUCER-SHAPED REVETMENT OFTEN JOINED TO LIGHT REVET. BY TRENCH.
BORAM	150 CM.	MOBILE	"DOUGHNUT" SHAPED, DOUBLE-WALLED EMPLACEMENT.	25' INNER DIAMETER	GENERATOR IN NEARBY REVETMENT	———	"DOUGHNUT" SHAPED, DOUBLE-WALLED REVETMENT WITH DITCH BETWEEN INNER & OUTER WALL FOR MANUAL OPERATION OF LIGHT. CABLE LEAD-IN VISIBLE.
RABAUL	150 CM.	FIXED	CIRCULAR SANDBAG AND WOOD REVETMENT ON TOP OF EARTH MOUND OVER BURIED STRUCTURE	12'-14' DIAMETER	GENERATOR LOCATED IN BURIED STRUCTURE BELOW MOUNT	2 GUN 127 MM DUAL PURPOSE BATTERY	LIGHT MOUNTED IN CIRCULAR SANDBAG & WOOD EMPLACEMENT ON TOP OF EARTH & SOD-COVERED STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
RABAUL	150 CM.	FIXED	RECTANGULAR WOOD REVETMENT FORMED BY UPWARD EXTENSION OF WALLS OF STRUCTURE HOUSING GENERATOR.	10' X 12'	GENERATOR LOCATED IN STRUCTURE BELOW MOUNT	2 GUN 127 MM DUAL PURPOSE BATTERY TWIN LIGHT POSITION SOUND LOCATOR, RANGE FINDER	LIGHT MOUNTED ON TOP OF RECTANGULAR STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
WAKE	150 CM.*	FIXED	HIGH, CONICAL, CONCRETE STRUCTURE.	10'-12' DIAMETER	GENERATOR IN MOUNT STRUCTURE	3 GUN HEAVY C.D. BATTERY 8" C.D. GUN 150 CM SEARCHLIGHT	LIGHT MOUNTED ON ROOF OF HIGH CONICAL CONCRETE STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
WAKE	150 CM.*	FIXED OR MOBILE	LOW, CIRCULAR, CONCRETE STRUCTURE	10'-12' DIAMETER	GENERATOR IN MOUNT STRUCTURE	3 GUN HEAVY C.D. BATTERY 8" C.D. GUN 150 CM. SEARCHLIGHT	LIGHT MOUNTED ON ROOF OF LOW, CIRCULAR, CONCRETE STRUCTURE HOUSING GENERATOR. RAMP LEADING UP ONE SIDE FOR REMOVAL OF LIGHT. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
WAKE	150 CM.*	MOBILE	IN SHALLOW DITCH LEADING FROM MAIN ROAD.	———	———	———	IN POSITION OF MOBILITY. POWER SOURCE LOCATED NEARBY.
WAKE	150 CM.*	FIXED	LOW, CIRCULAR, CONCRETE STRUCTURE	10'-12' DIAMETER	GENERATOR IN MOUNT STRUCTURE	———	LIGHT MOUNTED ON ROOF OF LOW, CIRCULAR, CONCRETE STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
MILI	150 CM.*	FIXED OR MOBILE	ON RAISED, CIRCULAR BASE IN HIGH, CIRCULAR EARTH REVETMENT.	16' INNER DIAMETER	GENERATOR LOCATED IN EMPLACEMENT BELOW PLATFORM OR IN NEARBY RECTANGULAR SHED	3 GUN HEAVY C.D. BATTERY TWIN SEARCHLIGHT POSITION	LIGHT MOUNTED ON RAISED CIRCULAR PLATFORM IN HIGH, CIRCULAR EARTH REVETMENT WHICH ALSO CONTAINS GENERATOR EQUIPMENT. BREAK IN REVETMENT WALL FOR ENTRANCE TO AREA BENEATH LIGHT AND FOR REMOVAL OF LIGHT.
MILI	150 CM.*	FIXED OR MOBILE	ON RAISED, CIRCULAR BASE IN HIGH, CIRCULAR EARTH REVETMENT.	16' INNER DIAMETER	GENERATOR LOCATED IN EMPLACEMENT BELOW PLATFORM OR IN NEARBY RECTANGULAR SHED.	HEAVY C.D. BATTERY	LIGHT MOUNTED ON RAISED CIRCULAR PLATFORM IN HIGH CIRCULAR EARTH REVETMENT WHICH ALSO CONTAINS GENERATOR EQUIPMENT. BREAK IN REVETMENT WALL FOR ENTRANCE TO AREA BENEATH LIGHT AND FOR REMOVAL OF LIGHT.
WEWAK	150 CM.*	MOBILE	CIRCULAR BUILT-UP TYPE EARTH REVETMENT.	16' INNER DIAMETER	GENERATOR LOCATED NEARBY	———	LIGHT MOUNTED IN CIRCULAR BUILT-UP TYPE EARTH REVETMENT. SEVERAL SMALLER EMPLACEMENTS LOCATED NEARBY MAY CONTAIN DIRECTOR & RELATED EQUIPMENT.
WEWAK	150 CM.	MOBILE	CIRCULAR "DOUGHNUT" SHAPED DOUBLE REVETMENT WITH BREAK IN WALL FOR LIGHT REMOVAL.	25' INNER DIAMETER	GENERATOR IN NEARBY REVETMENT	———	TYPICAL "DOUGHNUT" SHAPED DOUBLE REVETMENT FOR MANUAL OPERATION OF LIGHT. REVETMENT SHAPE, POWER LEAD-IN & PARABOLIC SHAPE OF LIGHT ARE DISTINCTIVE.
MALOELAP	150 CM.*	FIXED	LOW, CIRCULAR, CONCRETE STRUCTURE.	10'-12' DIAMETER	GENERATOR IN MOUNT STRUCTURE	3 GUN COASTAL DEFENSE BATTERY TWIN SEARCHLIGHT POSITION	LIGHT MOUNTED ON ROOF OF CIRCULAR CONCRETE STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
MALOELAP	150 CM.*	FIXED	LOW, CIRCULAR, CONCRETE STRUCTURE	10'-12' DIAMETER	GENERATOR IN MOUNT STRUCTURE	3 GUN COASTAL DEFENSE BATTERY TWIN SEARCHLIGHT POSITION	LIGHT MOUNTED ON ROOF OF CIRCULAR CONCRETE STRUCTURE HOUSING GENERATOR. PARABOLIC SHAPE OF LIGHT DISTINCTIVE.
VILA	150 CM.*	MOBILE	RECTANGULAR EXCAVATED TYPE EMPLACEMENT.	30' X 10' BY 5' DEEP	GENERATOR LOCATED NEARBY	———	EXCAVATED TYPE EMPLACEMENT WITH BREAK IN WALL FOR REMOVAL OF LIGHT. SOD COVER FOR CAMOUFLAGE OF REVETMENT.
VILA	150 CM.*	MOBILE	RECTANGULAR EXCAVATED TYPE EMPLACEMENT.	30' X 20' BY 5'-6' DEEP	GENERATOR LOCATED NEARBY	———	SINGLE BLAST WALL, SOD-COVERED FOR CAMOUFLAGE. BREAK IN WALL FOR REMOVAL OF LIGHT.
RANGOON	———	MOBILE	LARGE CIRCULAR EXCAVATED TYPE REVETMENT WITH BREAK IN WALL FOR LIGHT REMOVAL.	35' INNER DIAMETER	GENERATOR IN NEARBY BUILDING	GENERATOR & UNIDENTIFIED INSTALLATIONS	IN LARGE CIRCULAR EMPLACEMENT LOCATED IN TRUCK GRAVEYARD IN OPEN SQUARE IN CITY OF RANGOON. GENERATOR IN NEARBY BUILDING.
LAE	———	MOBILE	LOW HALF-CIRCLE, EARTH REVETMENT ADJACENT TO TRAIL.	8'-10' DIAMETER	GENERATOR LOCATED NEARBY	———	LIGHT LOCATED SOME DISTANCE INLAND FROM AIRSTRIP. NATURAL CAMOUFLAGE USED TO ADVANTAGE.
MINGALADON	———	MOBILE	"DOUGHNUT" SHAPED, DOUBLE REVETMENT WITH RAISED SEARCHLIGHT BASE IN INNER REVETMENT.	34' INNER DIAM OF OUTER REVETMENT	POWER LINE LEAD-IN PROBABLY FROM A MAIN POWER SOURCE	———	ONE OF SEVEN SIMILAR INSTALLATIONS AROUND AIRFIELD. BREAK IN REVETMENT WALL FOR REMOVAL OF LIGHT. CABLE LINE LEAD-IN FOR POWER. "DOUGHNUT" SHAPE DISTINCTIVE.

*INDICATES PROBABLE SIZE

P.I.O. — ANACOSTIA, D. C. — FEBRUARY, 1944

RESTRICTED

TECHNICAL STUDIES
CAMOUFLAGE

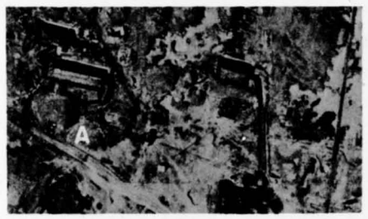
PALM

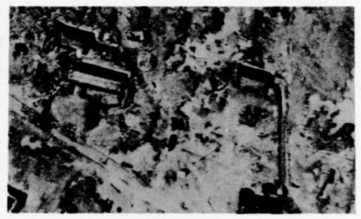
ALEXISHAFEN, NEW GUINEA
Sally

VILA, KOLOMBANGARA
120 mm. C.D.

SOD

VILA, KOLOMBANGARA
75 mm. covered with sod, germinating coconuts and palm fronds.





KISKA
Sod-covered buildings and underground storage at "A."

KISKA
Sod-covered buildings with revetments.

TECHNICAL STUDIES

CAMOUFLAGE (CONT.)

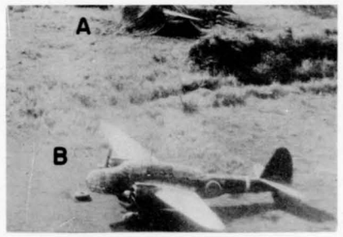
PAINT

RANGOON, BURMA

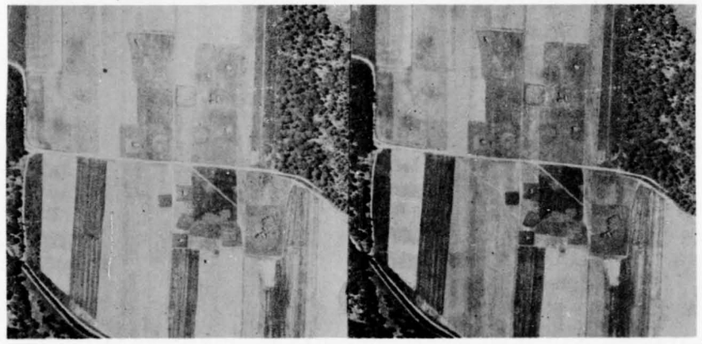
DAGUA. NEW GUINEA

NETTING & PAINT

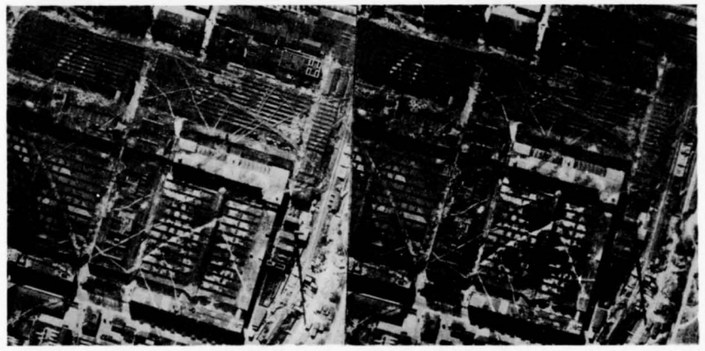
VUNAKANAU, NEW BRITAIN



BUT, NEW GUINEA
A. Lily with net.
B. Lily with paint.



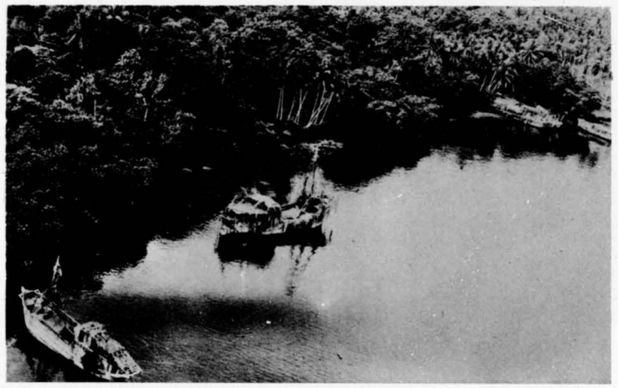
GERMANY — "AA"



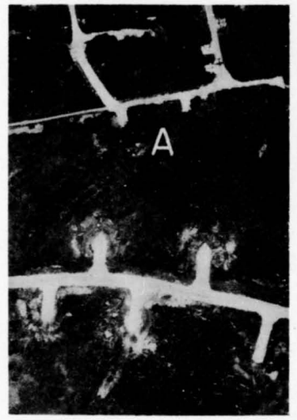
GERMANY - INDUSTRIAL

NATURAL

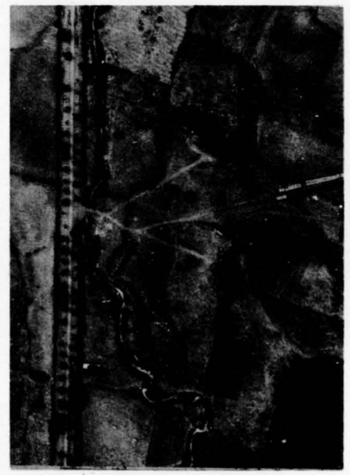
YEGYANBYIN, BURMA
Loose foliage scattered on awnings of boats.



MADANG, NEW GUINEA
Cargo luggers draped with foliage and utilizing shadow of tree-covered shoreline.

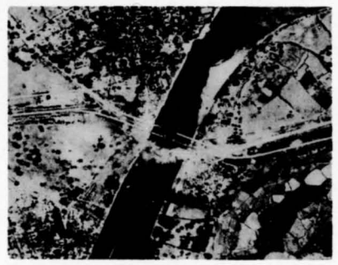


Utilization of existing trees in connection with plane revetments. Note "A" in particular.



MONYWA, BURMA
Huts constructed along hedges and covered with foliage. Note sharp contrast of unfinished hut.

SMOKE

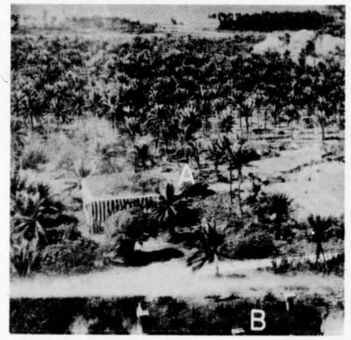


MYITNGE BRIDGE, BURMA
Smoke projectors

TECHNICAL STUDIES

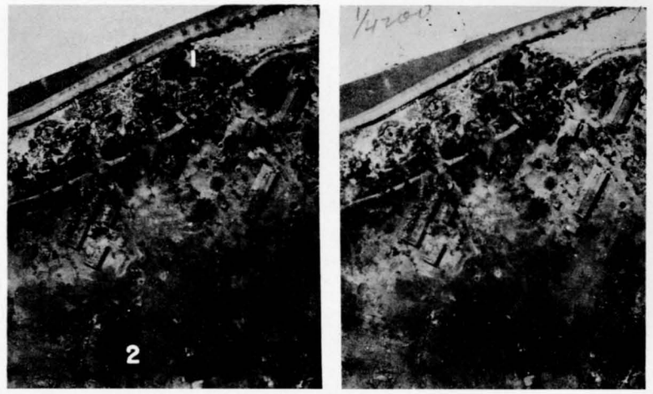
CAMOUFLAGE (CONT.)

SOD & VEGETATION



WOTJE

A. Concrete magazine with painted walls and sodded roof.
B. Concrete magazine, sodded roof with bushes.



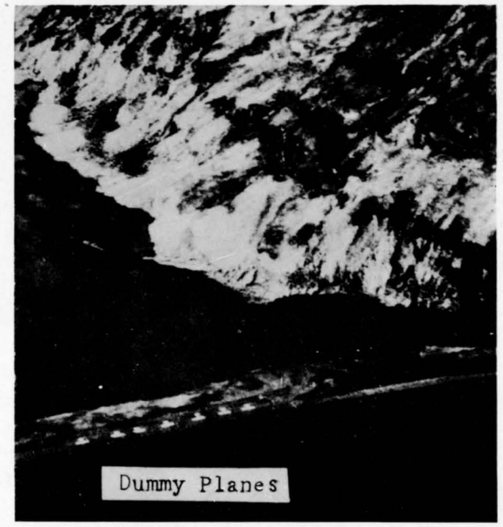
MALOELAP

1. Sod and Vegetation covered concrete pillbox.

2. Sod covered concrete magazine.

MALOELAP
Concrete pillbox covered with sod and surrounded by vegetation.

DECOYS & DUMMIES



KISKA
Jap dummy planes, poorly made of whitewash to draw attention to fact that they are dummies and thus not draw any well placed American bombs which would have destroyed storage dumps buried beneath them.

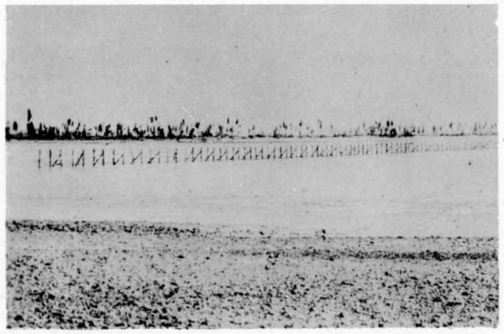
AALBORG, DENMARK
Dummy German airport is obvious because runways are too bright, angular, and well defined. There are no signs of construction activity. Strips probably whitewashed.

TECHNICAL STUDIES

OBSTACLES

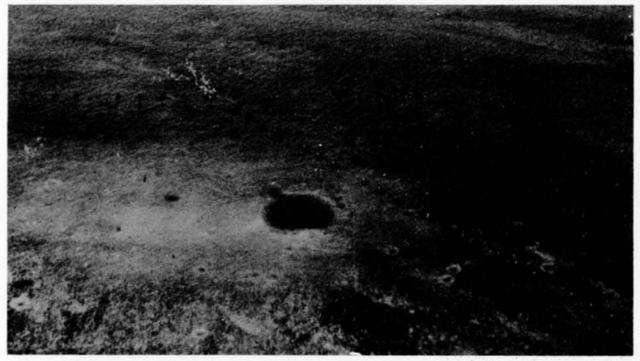
BOAT BARRIERS

BETIO

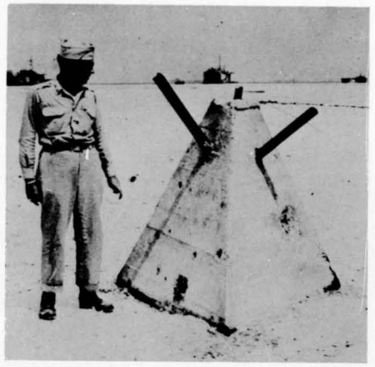


BETIO

ANTI-TANK



BETIO

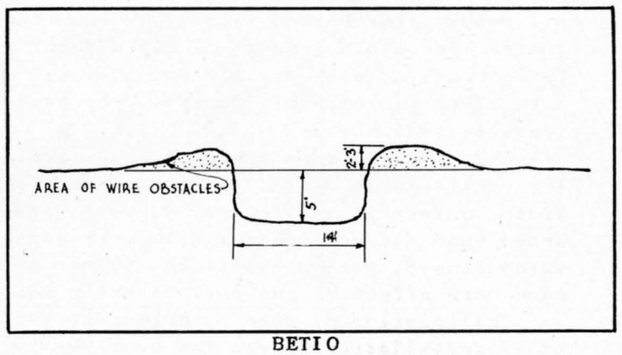


BETIO

PYRAMIDS (above)

Anti-tank obstacles of this type are four and one-half to five feet high and made of concrete in molds on shore. They are not fixed but left loose on the coral where their weight holds them in place. In some cases anti-boat mines were placed between the pyramids, and it may have been the intention of the Japanese to do this all around Betio Island.

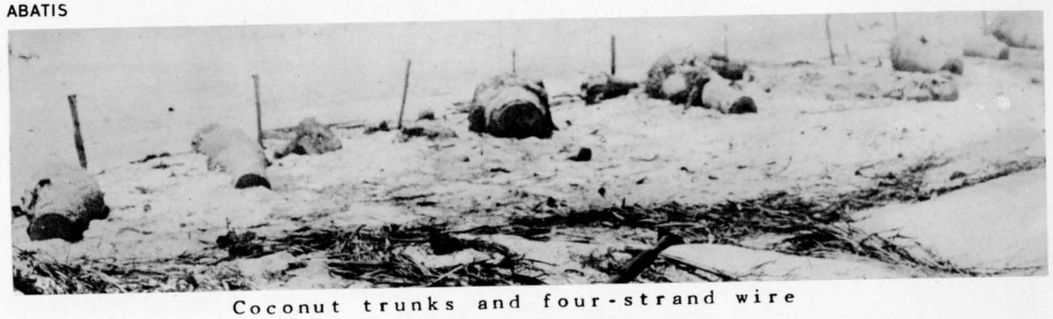
BETIO



BETIO

TECHNICAL STUDIES
OBSTACLES (CONT.)

ABATIS



Coconut trunks and four-strand wire

MAKIN

WIRE

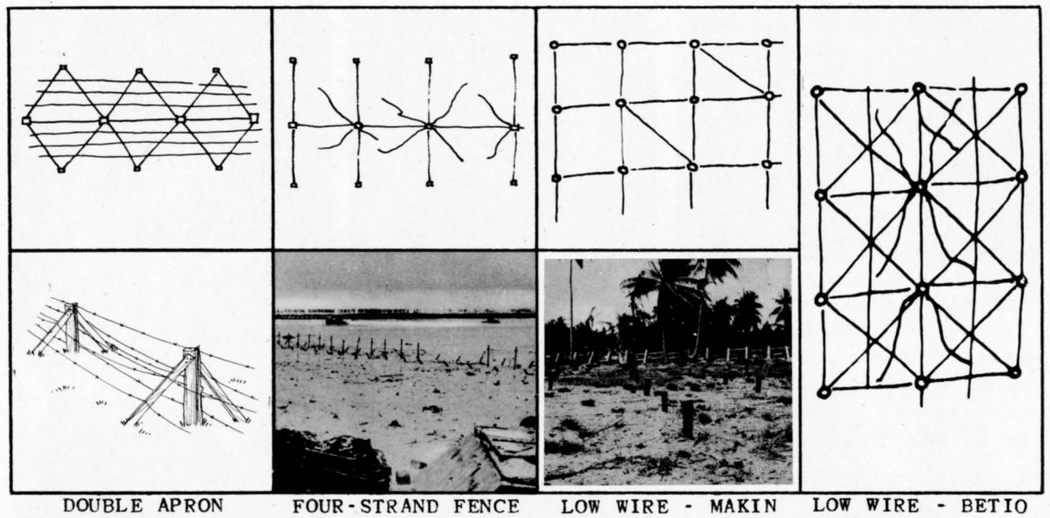
The Japanese use four principal types of barbed wire: High double apron, four-strand fence, and high and low wire entanglements. For all practical purposes, none of these can be seen in vertical photographs with a scale smaller than 1/10,000, except as a hazy line. In small scale photographs, a hazy line tracing a zig-zag course is in all probability barbed wire. The same type of line tracing a straight course may possibly be wire, but without ground information it cannot be interpreted with certainty. However, at scales of 1/5,000 and above with clear photographs, it should be possible to differentiate the four types listed above.

Double apron wire appears in vertical coverage as a hazy band having considerable width. A four-strand fence will appear to have no width, unless it has lateral support wires. Wire which appears as a broad band may be either a high wire entanglement or a series of double apron fences, more probably the former as this type installation is much more effective and only slightly more difficult to construct.

The location of wire with respect to tank traps, pillboxes, and other installations gives the best key to the type.

TECHNICAL STUDIES
OBSTACLES (CONT.)

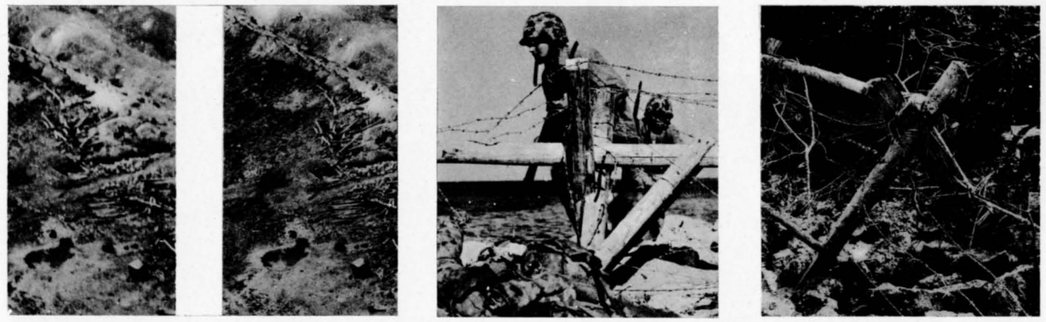
WIRE (CONT.)

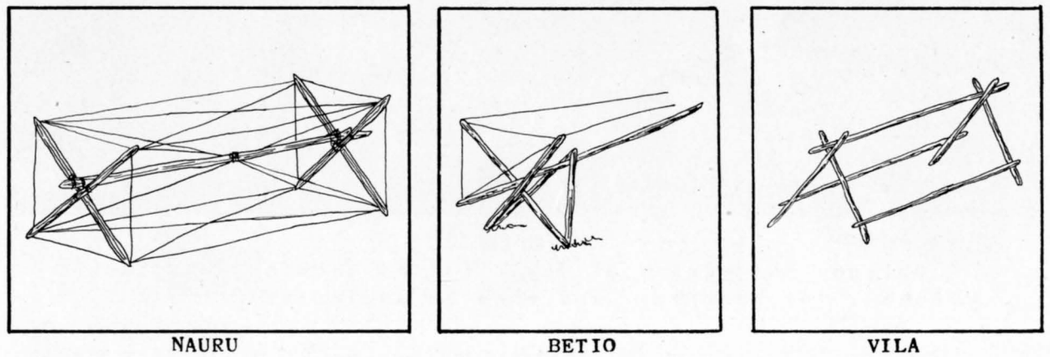


DOUBLE APRON | FOUR-STRAND FENCE | LOW WIRE - MAKIN | LOW WIRE - BETIO

CHEVAL-de-FRISE

Chevaux-de-Frise are frequently used to stop temporary gaps in wire entanglements, to barricade trenches leading toward the enemy, and to barricade roads and streets. They may be used as an underwater obstacle in beach defense.





NAURU | BETIO | VILA

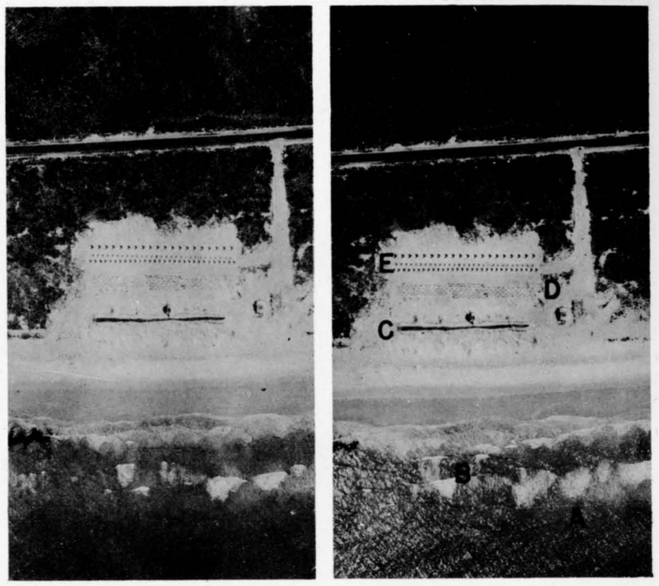
TECHNICAL STUDIES

OBSTACLES (CONT.)

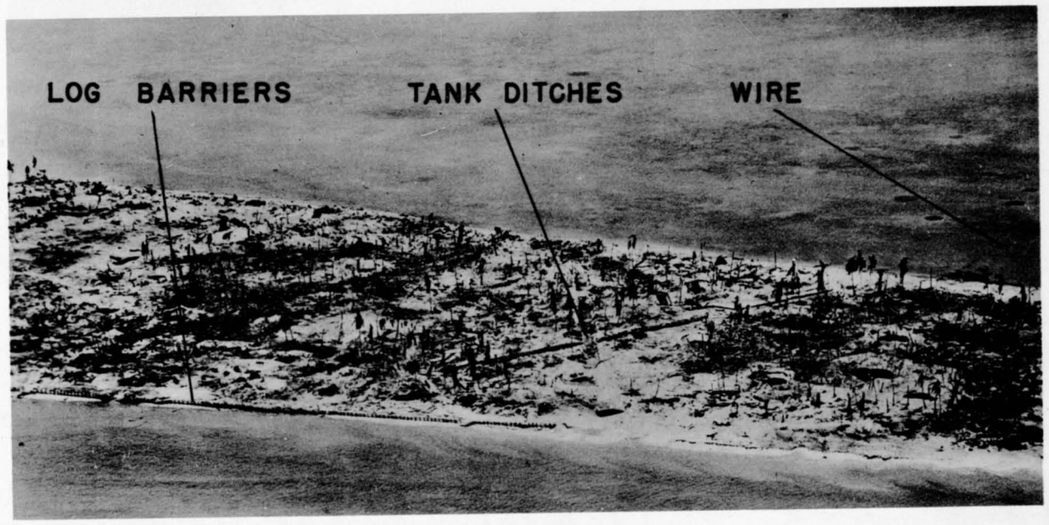
BARRICADES - GENERAL

MAKIN
Log barrier on Makin Island supplementing anti-tank ditch as defense. Same construction used here as in boat barriers on Tarawa Atoll.

ANTI BOAT MINE
(2 ft. diam.)



COMPARATIVE STUDY- UNITED STATES
(A) Log booms, (B) Skullies in surf, (C) Anti-tank ditch, (D) Low wire entanglement, (E) three rows of Skullies representing two types, three sizes.



BETIO
Oblique photograph of Betio Island showing anti-tank ditches, log barriers, and wire entanglements.

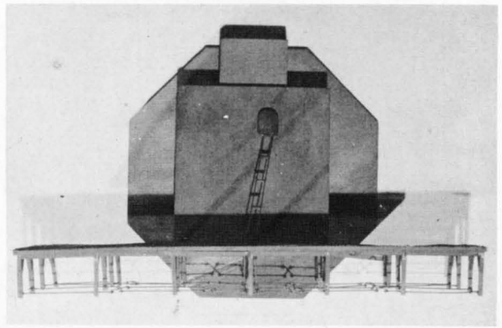
TECHNICAL STUDIES

ELECTRONICS

RADAR TYPES-JAPANESE

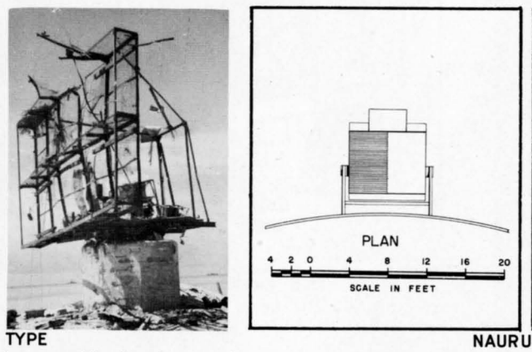
Radar sites are selected for the following reasons which the interpreter should keep in mind:

1. Highest point of elevation for greatest range.
2. Accessibility for installation.
3. Freedom from obstruction in sectors to be searched.
4. Maximum concealment.

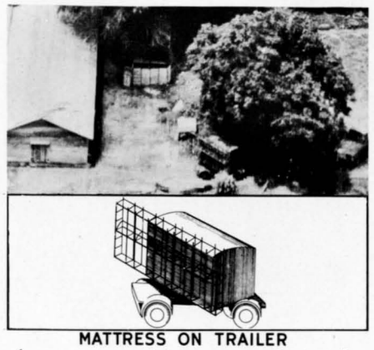


GUADALCANAL TYPE
(screen - 28 ft. x 18 ft.)

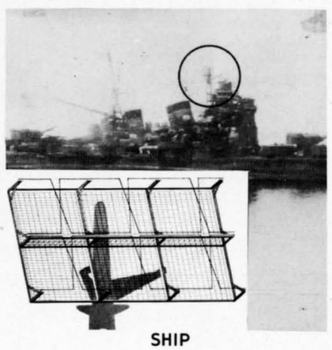
ATTU TYPE
(screen - 28 ft. x 18 ft.)



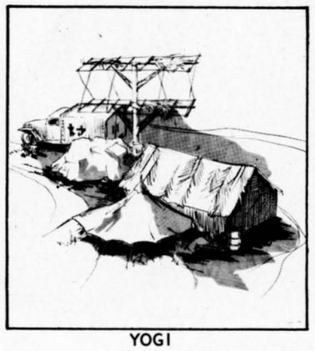
NAURU TYPE
(screen - 24 ft. x 15 ft.)



MATTRESS ON TRAILER
(screen - 12 ft. x 6 ft.)



SHIP
(screen- 10/12ft.x5/6ft.)

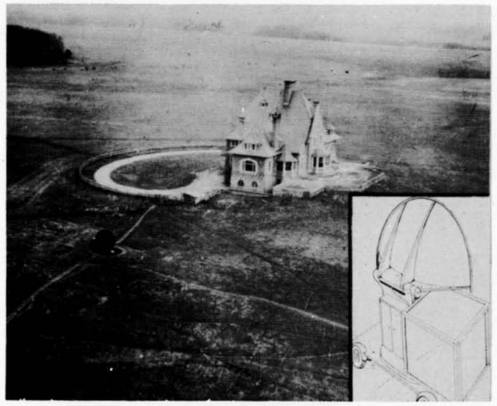


YOGI
(screen-20ft.x3ft.x7ft.)

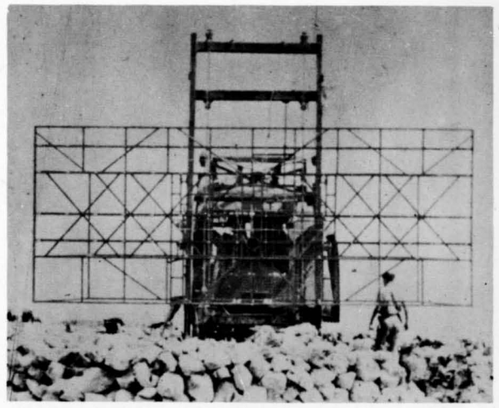
TECHNICAL STUDIES

ELECTRONICS (CONT.)

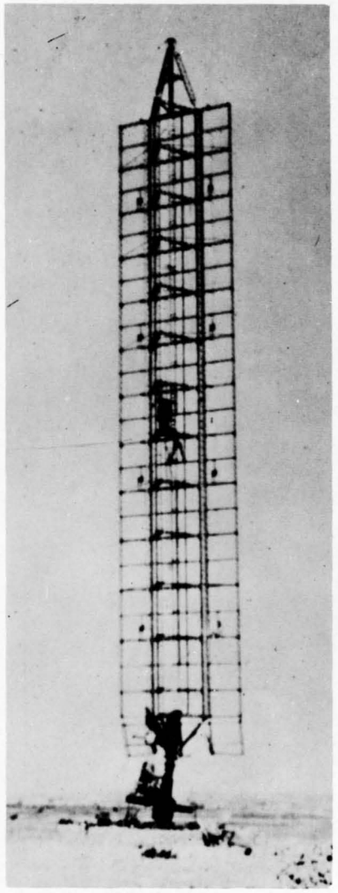
GERMAN



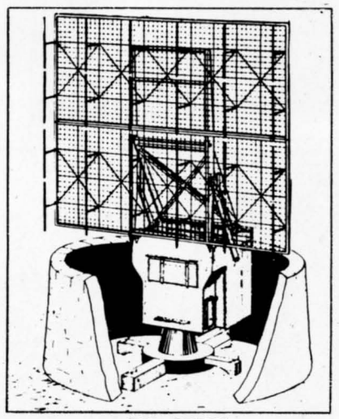
SMALL WURZBURG
(screen - 10 ft. diam.)



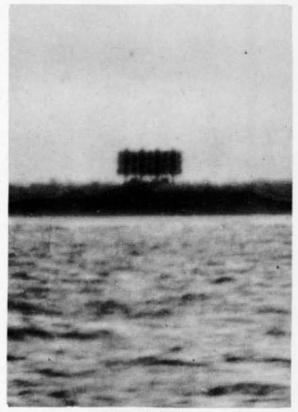
GEMA
(screen - 21 ft. x 9 ft.)



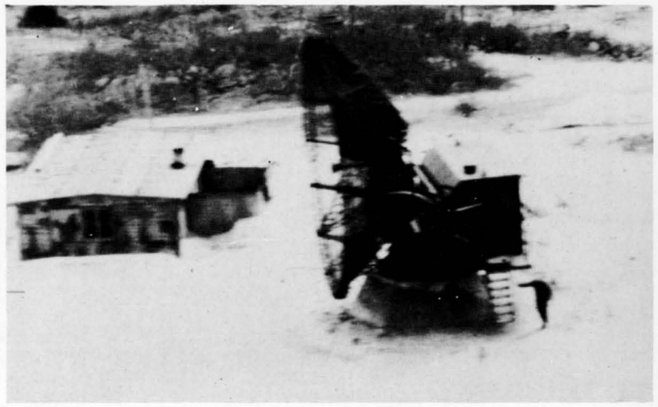
CHIMNEY
(screen - 125 ft. x 8 ft.)



OLD FREYA
(screen - 20 ft. x 16 ft.)



NEW FREYA
(screen - 100 ft. x 36 ft.)



GIANT WURZBURG
(screen - 24 ft. diam.)

RESTRICTED

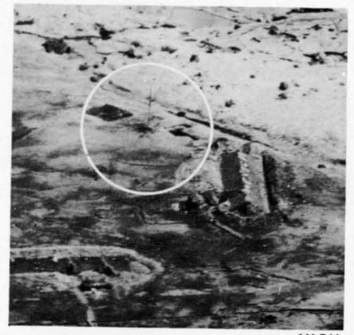
TECHNICAL STUDIES
ELECTRONICS (CONT.)

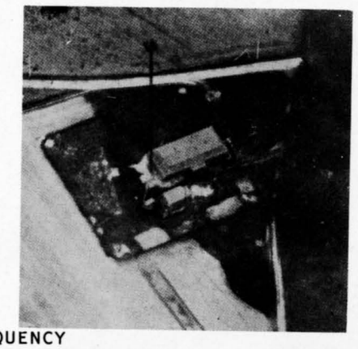
RADIO

LOW FREQUENCY	30 to 300 Kcs.	2 or more masts or towers*
MEDIUM FREQUENCY	0.3 to 3 Mcs.	
HIGH FREQUENCY	3 to 30 Mcs.	One mast or tower
VERY HIGH FREQUENCY	30 to 300 Mcs.	

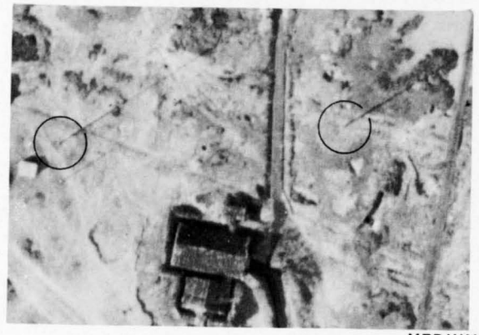
In General: LOW FREQUENCY = long range
HIGH FREQUENCY = short range

*2 or 3 masts of towers more than 300 feet in height will probably carry low frequency antennae.

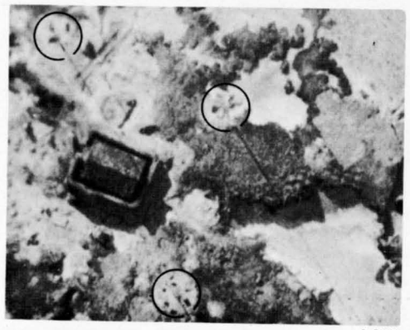


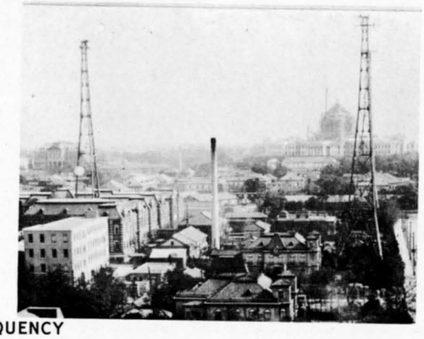


HIGH FREQUENCY



MEDIUM FREQUENCY





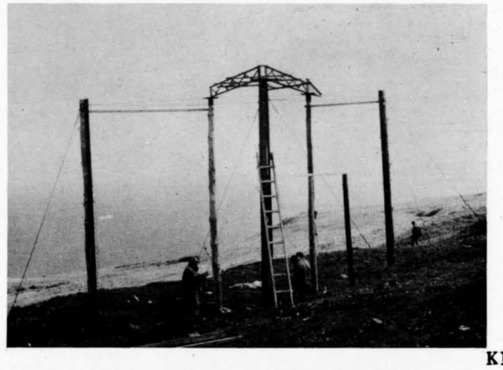
LOW FREQUENCY

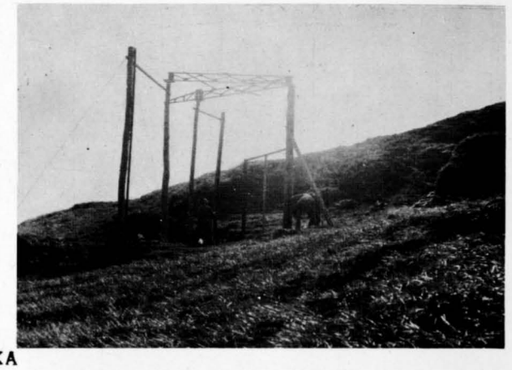
RESTRICTED

TECHNICAL STUDIES
ELECTRONICS (CONT.)

True navigation aids operate as transmitters. Radio range and radio beacons fall in this category. The German navigation aids were developed to aid bombers in locating targets in addition to guiding them back to their airdromes.

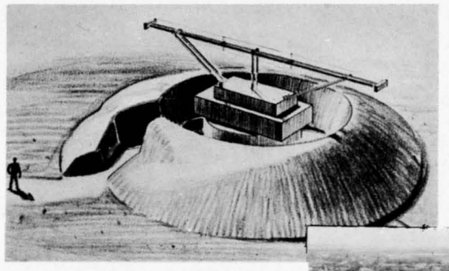
NAVIGATION AIDS - JAPANESE



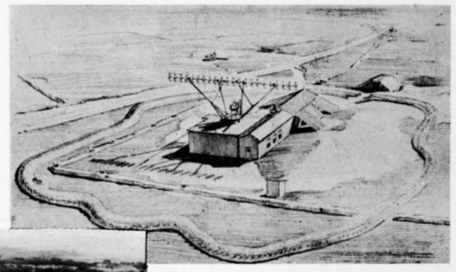


KISKA

NAVIGATION AIDS - GERMAN



RUFFIAN



BENITO

KNICKEBEIN

ELECTRA (not shown)

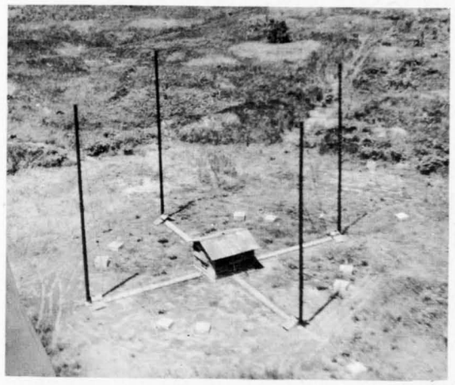
A long distance directional beam on the long wave beam. These beams are fanned out over the target area.

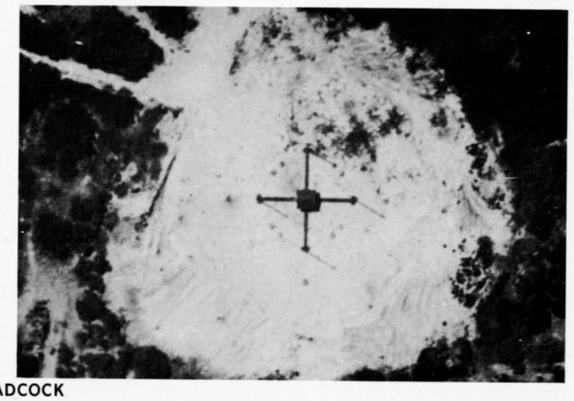
Two types (a) Consists of 2 complimentary installations, each with a simple tall mast and transmitter huts, about 2 miles apart.

(b) Consists of special aerial arrangements in what appears to be a multi-mast communications center.

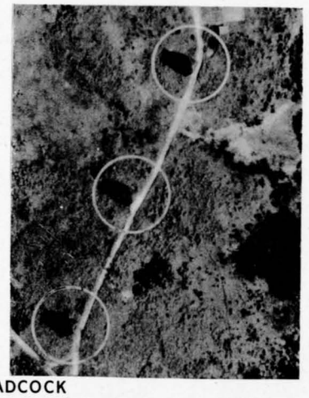
DIRECTION FINDERS - JAPANESE

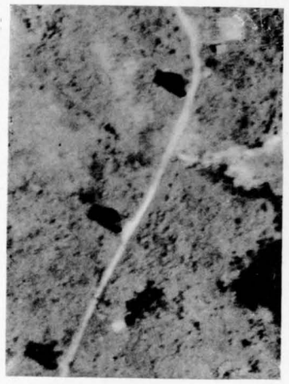
True direction finder equipment acts as a receiver of radio impulses - giving direction and distance to the source of such impulses. Diagonal distance between unipoles will indicate frequency. (EXAMPLE: 90 feet would be suitable for medium frequency up to 2 Mcs.; 25-30 feet, high frequency up to 10 Mcs., etc.) Direction finders may be used as aids to navigation.





OPEN ADCOCK

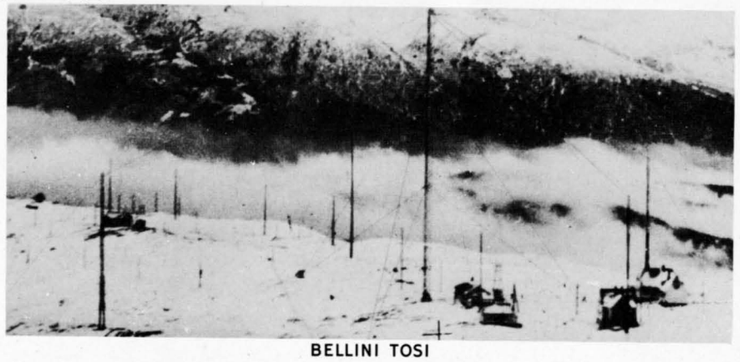




HOUSED ADCOCK

DIRECTION FINDERS - GERMAN

Adcock types shown above are used by both Germany and Japan.



BELLINI TOSI